



State of Utah

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DIVISION OF WATER QUALITY

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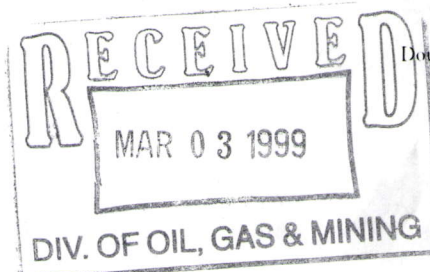
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Executive Secretary

February 17, 1999

Paul C. Spor, Executive Director
Tintic Utah Metals LLC
15988 Silver Pass Road
P.O. Box 51
Eureka, Utah 84628



Dear Mr. Spor:

Subject: Document Received from Tintic Utah Metals Dated July 7, 1998 [Addendum - UIC Area Permit Application for Burgin Mine (UIC Permit No. UTU500003)]; Letter Received from Tintic Utah Metals Dated January 19, 1999.

Subsequent to our October 21, 1998 partial response to your submittal noted above, we have completed our review of the submittal and find that some of the information requested in our June 6, 1997 letter to Keith Droste was not provided or was not substantiated. We have three major concerns regarding potential (1) induced increases in flow rates of brackish geothermal waters into the regional aquifer and to springs discharging to Utah Lake, (2) effects of injectate mounding on the regional aquifer and alluvial aquifers in Goshen Valley and Cedar Valley, and (3) creation of new springs.

Quite frankly, we believe that addressing these technical issues adequately may not be possible due to geohydrologic uncertainties and conclusions that would, by necessity, have to be drawn from interpretation and extrapolation of relatively limited data. We would suggest that your time and resources may be better utilized in pursuing alternatives such as treatment and beneficial use of the mine water. We will not be able to proceed with the permit process until either technical data is provided as noted below which eliminates these concerns or, if this is not possible, a monitoring plan is submitted which adequately addresses these concerns and specifies 1) potential effects/sites to be monitored, 2) an early warning system, and 3) corrective action to be taken if needed. Adverse results from the early warning system may require corrective action such as modification or termination of injection activities. Obviously, this could be an expensive and high risk option for the company. In view of the above, we would like to arrange a meeting with you to discuss these issues and options. We are providing the following comments to outline the technical and other information that would be needed to address the issues stated above.

Needed Technical Data:

1. Please evaluate what effects the injectate, under maximum anticipated hydraulic head(s) at each proposed injection site, may have on the regional aquifer, alluvial aquifers in Cedar Valley and Goshen Valley, springs, wells, and Utah Lake. Include an evaluation of the potential for the creation of new springs. Evaluations must include the potential effects due to flow along faults and fractures as well as flow across fault planes. Possible widening of solution channels due to the increased injectate temperature must also be considered. If effects are anticipated, include qualitative as well as quantitative considerations, especially total dissolved solids (TDS) and heavy metals. See the enclosure accompanying our June 6, 1997 letter for specific analytes.

Specifically include an evaluation of the potential for an increase in flow rates to existing geothermal springs around and in Utah Lake. Increases in the flow rates of these high TDS geothermal springs is a concern, as the lake is already near the 1200 mg/l irrigation standard for TDS.

Your submittal indicates that the subterranean hot springs supplying the East Tintic geothermal zone flow only a few hundred gallons per minute (gpm), yet Kennecott pumped 8,500 - 9,800 gpm for eight years (about 120,000 acre feet) in their mine-dewatering efforts without an apparent decrease in water temperature or total dissolved solids (TDS). Please evaluate the possibility that dewatering the mine at up to 18,000 gpm could induce an increase in the flow rate of subterranean geothermal water upwelling in the area. This is a concern because an increase in the volume of low quality geothermal water flowing into the regional aquifer, transported thousands of feet and "mounded" in a new location, could have detrimental effects on that aquifer and other hydrologic systems hydraulically downgradient (i.e., Cedar Valley, Goshen Valley, Utah Lake, etc.). If an increase in the flow rate is deemed likely, please discuss what effects the injection "mounding" of such an increase would likely have on the specific hydrologic regimes noted above.

Utah Dept. of Natural Resources Technical Publication No. 16 (1967) indicates that bedrock ground water from the East Tintic Mountains moves into the valley fill in the southern end of Cedar Valley. Since your project area is adjacent to the southern end of Cedar Valley, and the water table elevation in that part of the valley is about 400 feet below the proposed maximum mound height (elevation 5065 feet), please evaluate the effect of the proposed mound of geothermal water on the quality of ground water in Cedar Valley.

Please also provide an evaluation of the potential for injection mound water to migrate westward past the 4800 foot elevation of the regional ground water divide.

We note that your latest submittal stated that "there is no potential for impacts on alluvial aquifers including wells and springs in Goshen Valley", and that "There is no potential for creating new thermal springs." We feel that some available data was overlooked which would seem to indicate otherwise regarding Goshen Valley, with much of this data since provided to you by this office. Your submittal provided little discussion as to how the "new thermal springs" specific conclusion was reached. Distance drawdown estimates were used to indicate that zero drawdown and mounding would occur at Utah Lake, with no indication of the specific methodology or data used and no discussion of possible increases in flow rates to geothermal springs in and around Utah Lake.

Some of the possibly overlooked data includes information from the following eight wells and the presence of the Range Front Fault which indicate a potential for geothermal water to impact alluvial aquifers and wells in Goshen Valley. Three wells in northern Goshen Valley which are completed in paleozoic rocks and may possibly be affected by changes to the geothermal system are (C-8-1) 16cbb-1, (C-8-1) 29bdc-1, and (D-8-1) 20cdb-2. Two thermal wells located approximately one and ten miles northwest of the town of Goshen and three others between 2-4 miles southwest of Goshen are possibly indicative of deep geothermal waters migrating into Goshen Valley alluvial aquifers. Also, it is known that basin and range faulting followed the deposition of the tertiary volcanics, and that these volcanics have been breached in places. An example would be the nearby Range Front Fault, which placed fractured paleozoics in horizontal contact with about 500 feet of Goshen Valley alluvial aquifers. If this fault is transmissive, geothermal waters in the paleozoic rocks may migrate directly into the aquifers.

2. Please provide representative water quality analyses for the injectate and for ground water in the receiving aquifer hydraulically upgradient and downgradient from the proposed injection well site(s). Include a detailed description of the anti-scalants that are proposed to be added to the injectate, along with intended concentrations.

The quality of geothermal ground water in the project area appears to vary with distance from the more permeable fault zones. One such variance is indicated by water from the Apex Standard No. 2 shaft with a chloride content of 2,450 mg/l versus 6,000 mg/l from the Burgin mine, although both sources exhibit similar geothermal temperatures. Since such significant variations in receiving aquifer quality in the proposed project area might preclude the issuance of an area permit, enough ground water samples from the receiving aquifer in the area should be analyzed to determine what variations currently exist. If adequate data is not available or obtainable for the currently proposed project area, the area permit boundaries may have to be modified or individual well permits may be required instead of an area permit. See the enclosure from the June 6, 1997 letter for required analytes.

3. Please provide proposed injection well construction details which show injection through tubing with a packer set at least as deep as the base of the volcanics. Although we understand that the injection well(s) are not intended to be pressurized at the surface, as a precaution to protect the perched aquifer(s) from unacceptable contamination the injection well(s) must be configured to allow the tubing-casing annulus to be pressure tested as part of an annual mechanical integrity test. A reduced annulus pressure will be required to be maintained within certain limits during injection. This would preclude the presence of most of the drop pipe perforations shown in your figure A.8.

In addition to the technical data requested above, please provide a list, with addresses, of all those parties with water rights to ground water which may be affected by the injection operation.

We are willing to forgo monitoring of the perched aquifer(s) as long as the level of the regional water table aquifer and any induced mounding stays well below the base of the volcanic rocks and mechanical integrity testing of the injection well tubing-casing annulus indicates no injectate has migrated into a perched aquifer.

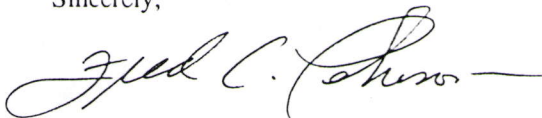
In response to your January 19, 1999 letter, we strongly encourage the treatment and beneficial use of Burgin Mine water instead of disposal by injection. The possible detrimental effects of such disposal on Utah Lake and

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various aquifers as noted above are a real concern to us. It may be helpful in your mine water appropriation efforts with the Utah Division of Water Rights to pursue the possibility noted in paragraph 3 of Item 1 above, that pumping the mine might actually induce an increase in the flowrate of subterranean geothermal water upwelling in the area. If that is the case, possible opponents to your appropriation proposal might be appeased to know that you will be bringing in some "new" water, or at least diverting and treating water that might otherwise degrade the quality of water in Goshen Valley, Utah Lake, etc.

Feel free to share this letter with the Division of Water Rights. We would be happy to assist you in achieving the treatment/beneficial use objective. Possibly a joint meeting between Tintic Utah Metals and the Divisions of Water Rights and Water Quality would be helpful. Please call Jerry Jackson of this office at 801-538-6146 if you have any questions, if you want to meet with us, or if we can assist you in any way.

Sincerely,



Fred C. Pehrson, P.E., Manager
Permits, Compliance & Monitoring Branch

FCP:glj/fb

cc: Dwight Hill, Utah County Health Department
Douglas Minter, EPA Region VIII
Utah County Commission
Wayne Hedberg, Division of Oil, Gas, and Mining
Michael Georgeson, Division of Drinking Water
Elberta Water Company
Town of Goshen
Mountainlands Assn. Of Governments

